LAWRENCE LIVERMORE
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, July 5-8, 2011

Innovation, here we come

From left, Sam Brinker, Livermore Site Office; Rep. John Garamendi; Deputy Director Tom Gioconda; Rep. Jerry McNerney; and Livermore Mayor Marshall Kamena cut the ribbon for the innovation center.

In an initiative that aims to boost the nation's economic competitiveness, the Laboratory opened the High Performance Computing Innovation Center (HPCIC) last week

The innovation center will facilitate national lab/industry collaboration, applying high performance computing to product design, development and manufacturing, data management and the operation of complex energy and communication systems. Industries expected to benefit from the use of HPC range from aerospace, automotive and transportation to utilities, energy, health care, finance, materials manufacturing, nanotechnology and consumer electronics.

The innovation center was opened in a ribbon-cutting ceremony attended by local congressional Reps. John Garamendi and Jerry McNerney as well as other local officials.

The innovation center is the first step in the creation of a collaboration zone, called the open campus, being developed on the Livermore Lab's east side.

To read more, go to the Web.

What's that smell?

The cold and windy Southern Ocean favors the exchange of CO2 with the atmosphere. ***Photo courtesy of N.Metzl, August 2000, oceanographic cruise OISO-5.***

It's the "smell of the sea," which often smells like cabbage or rotten eggs.

The culprit is increased production of a sulfur-containing compound produced by marine plankton called dimethyl sulfide, or DMS.

Livermore researcher Philip Cameron-Smith and colleagues from Los Alamos and Oak Ridge national laboratories and the New Mexico Institute of Mining and Technology found through computer modeling that dimethyl sulfide (DMS) will increase significantly in certain parts of the ocean and decrease in others if the world continues with a business-as-usual fossil fuel dependency.

DMS, a sulfur-containing compound that affects the heat balance of the Earth, is one of the major precursors for aerosols that trigger could formation and reflect sunlight. DMS represents the largest source of natural sulfur emissions.

To hear an interview with Cameron-Smith, go here.

And the most energy efficient supercomputer is…

IBM's BlueGeneQ, which will be deployed at the Laboratory in 2012 as Sequoia, has earned the title of the world's most energy efficient supercomputer from the Green 500. A prototype of the machine was announced last week as No. 1 on the Green 500 list.

Energy efficient supercomputers can allow users to realize critical cost savings by lowering power consumption, reducing expenses associated with cooling and scaling to larger systems while maintaining an acceptable power consumption bill.

Designed to be a 20-petaFLOP/s (quadrillion floating point operations per second) system, Sequoia will be used by the National Nuclear Security Administration's Advanced Simulation and Computing program to conduct stockpile stewardship research. Sequoia will be installed in the Laboratory's Terascale Simulation Facility starting in early 2012.

The Green500 has been compiled since 2005 by computer scientists and engineers at Virginia Tech to emphasize energy efficiency as an important component of supercomputing performance, in addition to speed as measured in floating point operations per second (FLOPS).

To read more, go to the Web.

Yang recognized as fellow

Lin Yang

Lab physicist Lin Yang of the Condensed Matter and Materials Division (CMMD) has been named a fellow of the Institute of Physics in recognition of his "personal contribution to the advancement of physics as a discipline and a profession," as well as for his work in dual areas of multidiscipline physics.

"It's truly an honor to be recognized for something that I enjoy doing every day at the Lab," Yang said on receiving the news of his selection as fellow.

Yang received his Ph.D. in physics from University of California, Davis. In 1989, he was a postdoctoral fellow at Argonne National Laboratory. He joined LLNL's H Division in 1991. Yang has developed several molecular dynamics codes using petascale computers.

His primary research interest is classical and quantum molecular dynamics simulations of materials under extreme conditions.

To read more, go to the Web.

Beyond the stars

Kim Knight

Using an instrument originally developed to probe the minute amounts of stellar dust found in meteorites, Kim Knight has developed a technique to analyze raw materials to determine the fallout from a nuclear explosion.

Called Resonance Ionization Mass Spectrometry or RIMS, staff scientist Knight and LLNL colleague Ian Hutcheon, along with collaborators at Argonne National Laboratory and University of California, Berkeley, have used a laser to trace samples containing very few atoms of an element. In the test case, Knight was able to identify trace amounts of uranium from a sample of glass taken from the Nevada National Security Site (formerly known as the Nevada Test Site).

The team also was able to analyze and identify the sample at the isotopic level faster than traditional methods.

The goal was to identify uranium and plutonium isotopic ratios in a fallout sample.

To read more, go to the Web.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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